

Prueba 4 Física

RESOLUCIÓN

Forma B.

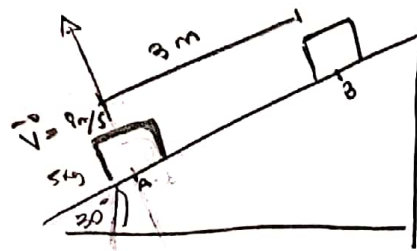
CADETE RAÚL SILVA

2° E.C.

272

1)

Blque 5 kg



$$U_g = m \cdot g \cdot h$$

$$U_g = 5 \cdot 10 \cdot 3 \sin(30)$$

$$U_g = 75$$

$$\vec{F}_t - \vec{F}_i = W_{FNL}$$

$$U_g - \frac{1}{2} m \cdot v^2 = \vec{F}_t \cdot d \cdot \cos(180^\circ)$$

$$U_g - \left(\frac{1}{2} \cdot 5 \cdot 9^2 \right) = (U_k \cdot m \cdot g \cdot \cos(30)) \cdot d \cdot \cos(180^\circ)$$

$$75 - 160.5 = (U_k \cdot 5 \cdot 10 \cos(30)) \cdot 3 \cdot -1$$

$$75 - 160.5 = -129.9 U_k$$

$$0.653 = U_k$$

$$2) \quad \vec{p}_{\text{antes}} = \vec{p}_{\text{después}}$$

$$m \cdot v = \frac{m}{2} \cdot 20 \cos 37^\circ + \frac{m}{2} \vec{v}_{2,x} \cdot \cos \theta$$

$$2m = \frac{m}{2} (20 \cdot \cos 37^\circ + \vec{v}_x)$$

$$\frac{16}{\cos 37^\circ \cdot 20} = v_x$$

$$\boxed{v_x = 0,03 \frac{\text{m}}{\text{s}}}$$

$$\vec{p}_{y \text{ antes}} = \vec{p}_{y \text{ después}}$$

$$0 = \frac{m}{2} \cdot 20 \cdot \sin(37^\circ) + \frac{m}{2} \cdot \vec{v}_{2,y}$$

$$\boxed{v_y = -12,04 \frac{\text{m}}{\text{s}}}$$

$$|\vec{v}_{2,y}| = \sqrt{(0,03)^2 + 12,04^2}$$

$$|\vec{v}| = 12,04$$

$$\vec{v} = [0,03 \hat{i} - 12,04 \hat{j}] \frac{\text{m}}{\text{s}}$$

$$\text{Argtan} = \frac{-12,04}{0,03}$$

$$\angle = 89,86^\circ$$

R// El segundo fragmento adquiere una velocidad de 12,04 m/s formado por un ángulo de 89,86° sobre la trayectoria original.

3)

$$R_{\text{stacion}} = 314 \text{ (m)}$$

$$t = 30 \text{ s}$$

$$R_1 = 10 \text{ cm} = 0,1$$

$$R_2 = 4 \text{ cm} = 0,04$$

$$R_3 = 40 \text{ cm} = 0,4 \text{ m} \rightarrow \text{Rueda}$$

$$V = \frac{314}{30} = 10,5 \frac{\text{m}}{\text{s}}$$

$$\omega = \frac{V}{r} = \frac{10,5}{0,1}$$

$$\omega_2 = \frac{V}{R_2} = \frac{10,5}{0,04}$$

$$\omega_3 = \frac{10,5}{0,4}$$

$$\omega = 105 \text{ [rad/s]}$$

$$\omega_2 = 262,5 \text{ [rad/s]}$$

$$\omega_3 = 26,25 \frac{\text{rad}}{\text{s}}$$

$$a) \quad r = 0,4$$

$$\omega_3 = 26,25 \frac{\text{rad}}{\text{s}}$$

$$\omega = \frac{\Delta \theta}{\Delta t} = \quad ?$$

$$\omega \cdot \Delta t = \Delta \theta$$

$$26,25 \cdot 30 = \Delta \theta$$

$$787,5 \text{ rad} = \theta$$

$$787,5 \text{ rad} / 12,5 \frac{\text{rad}}{\text{vuelta}} = 125 \text{ vueltas}$$

$$R_{11} = R_0 \text{ 125 vueltas en } \omega_3$$

$$b) \quad \vec{\omega}_3 = \frac{\Delta \theta}{\Delta t}$$

$$\vec{\omega} = \frac{787,5}{30}$$

$$\vec{\omega}_3 = 26,3 \frac{\text{rad}}{\text{s}}$$

$$c) \quad V_1 = V_3$$

$$\omega_1 \cdot R_1 = \omega_3 \cdot R_3$$

$$\omega = \frac{\omega_3 \cdot R_3}{R_1}$$

$$\omega = \frac{26,3 \cdot 0,04}{0,1}$$

$$\omega = 10,52 \left(\frac{\text{rad}}{\text{s}} \right)$$